Intestinal Parasites in Southeast Asian Refugee Children

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To determine the predictability of pediatric stool-parasite patterns among various Southeast Asian ethnic groups, I collected data from medical and microbiology laboratory records on all Southeast Asian refugee children who had a stool specimen examined for ova and parasites over a 21-month period. For most of the children, the specimen was examined as part of routine "health screening." The patterns of infection by ethnic group for those Vietnamese and Laotian children living in Seattle differ from the patterns seen in other geographic areas.

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Of the many studies in which the infection rates and varieties of intestinal parasites in Southeast Asian refugees now living in the United States have been examined, only two focused specifically on children.[1,2] In the study by Tittle and co-workers, 65 out of 100 Southeast Asian pediatric patients had one or more intestinal parasites present on initial screening ova and parasite examination.[2] These authors also suggested that different patterns of stool parasites occur among different ethnic groups within the Southeast Asian pediatric refugee population.

I did a retrospective study to examine a larger series of Southeast Asian children with intestinal parasites and to determine whether the notion of discrete stool-parasite patterns among various ethnic groups is valid in the Seattle area.

Patients and Methods

Data were collected from the medical records and Microbiology Laboratory records of all Southeast Asian children whose stool specimens were examined for ova and parasites between March 1, 1981, and December 31, 1982, a time of maximum refugee influx to the Seattle area. All had been in the United States for fewer than 18 months at the time of initial visit and presented to the Harborview Medical Center Pediatric Clinic for initial health screening and ongoing well-child care. Stool specimens were examined for ova and parasites as part of well-child care and health screening in 75% of the children, who were asymptomatic; in the remaining 25%, the stool specimens were examined for ova and parasites as part of an evaluation for abdominal pain, diarrhea or failure to thrive (or all of these).

Stool specimens were examined for parasites by one of three laboratory technicians in the Microbiology Laboratory at Harborview Medical Center. Fresh specimens were preserved in polyvinyl alcohol and 10% formaldehyde solution at a ratio of approximately one part stool to four parts preservative; these were processed by direct-formaldehyde solution-ether concentration of formalinized material and Wheatley trichrome stain of polyvinyl alcohol material.[3]

Results

The total number of stool ova and parasite specimens submitted from Southeast Asian children seen in Pediatric Clinic during the 21-month period was 461. Of these 461 specimens, 338 represented a child's first specimen examined, and these 338 children became the study population. Of those patients, 184 were Laotian (lowland), 5 were Lao-Mien, 14 were Hmong, 102 were Khmer (Cambodian) and 33 were Vietnamese. Ages ranged from 5 weeks to 16 years, with a mean age of 6.5 years. There were no significant differences in age distribution, sex or time of US arrival among the ethnic groups.

Table 1 lists the number of positive identifications and the distribution of multiple infections among the 338 patients. Roughly half of those examined had one or more parasites identified (positivity rate, 55.6%), and of those with positive findings, half had multiple species identified. In our sample, no child younger than 6 months had an intestinal parasite found in a stool specimen.

Table 2 shows the number of children in each ethnic group with one or more positive identification(s) and the total number of parasite species positively identified for all children in that ethnic cohort. The Laotian children appear to

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have a slightly higher average number of different parasites per infected child than other ethnic groups. The cohorts differed significantly in their positivity rates ($\chi^2=19.61$, degrees of freedom [df]=4, $P<.001$). Partitioning of the groups[4] indicated that Laotians and Cambodians as a group had significantly greater positivity rates than did the Lao-Mien, Hmong and Vietnamese as a group.

Table 3 gives the positive identifications by species of parasite and the ethnic origin of the children. The parasite species are arranged in decreasing frequency of identification for the whole sample. The first three species (*Giardia lamblia*, hookworm and *Clonorchis sinensis*) accounted for 56.2% of all positive identifications. *G lamblia*, *C sinensis*, *Trichuris trichiura* and *Hymenolepis nana* all showed significant differences in infection rates across the three ethnic groups that resulted when the Lao-Mien and Hmong children were combined into a single cohort with the lowland Laotian children.

TABLE 1.—*Children in Sample (N=338) With Single and Multiple Parasites Identified in Stool**

Parasites	Children With Pos. Specimen (Number)	Parasites Identified (Number)
Single	94	(×1) 94
2	57	(×2) 114
3	22	(×3) 66
4	13	(×4) 52
5	1	(×5) 5
6	1	(×6) 6
Total	188	337

*Overall positivity rate=55.6 per 100 specimens.

Discussion

The positivity rate for parasite infection found by examining a single stool specimen in this pediatric population (55.6%) is comparable to the rate seen in adult populations

TABLE 2.—*Children Tested and Positive Identifications by Ethnic Group**

Ethnic Group	Children Tested (Number)	Children With Pos. Stools for Parasites (Number)	Organisms Identified (Number)	Parasites per Infected Child (Mean)	Positivity Rate† (Percent)
Laotian	184	107	205	1.92	58.2
Lao-Mien	5	2	3	1.50	40.0
Khmer (Cambodian)	102	66	110	1.67	64.7
Hmong	14	3	5	1.67	21.4
Vietnamese	33	10	14	1.40	30.3
Totals	338	188	337	1.79‡	55.6‡

*Test of significance of differences between ethnic groups: $\chi^2=19.61$ (df=4), $P<.001$.
†Positivity rate equals percent of infected children among those tested.
‡Weighted mean.

TABLE 3.—*Number of Children in Each Ethnic Group Infested by Each Species of Parasite**

Organisms	Laotian Number (Percent)	Lao-Mien Number (Percent)	Hmong Number (Percent)	Khmer (Cambodian) Number (Percent)	Vietnamese Number (Percent)	Total Number (Percent)	Difference Among Ethnic Groups†
Giardia lamblia	45 (24.5)	2 (40.0)	0	24 (23.5)	1 (3.0)	72 (21.3)	$P<.05$
Hookworm	34 (18.5)	1 (20.0)	2 (14.3)	28 (27.4)	5 (15.1)	70 (20.7)	NS
Clonorchis sinensis	44 (23.9)	0	0	2 (2.0)	2 (6.1)	48 (14.2)	$P<.001$
Strongyloides stercoralis	15 (8.1)	0	0	15 (14.7)	1 (3.0)	31 (9.2)	NS
Endolimax nana	13 (7.1)	0	1 (7.1)	14 (13.7)	2 (6.1)	30 (8.9)	NS
Trichuris trichiura	20 (10.9)	0	2 (14.3)	2 (2.0)	3 (9.1)	27 (8.0)	$P<.05$
Entamoeba coli	16 (8.7)	0	1 (7.1)	6 (5.9)	0	23 (6.8)	NS
Hymenolepis nana	5 (2.7)	0	0	11 (10.8)	0	16 (4.7)	$P<.005$
Ascaris lumbricoides	5 (2.7)	0	0	2 (2.0)	0	7 (2.1)	. . .
Entamoeba histolytica	2 (1.1)	0	0	2 (2.0)	0	4 (1.2)	. . .
Entamoeba hartmanni	1 (0.5)	0	0	2 (2.0)	0	3 (0.9)	. . .
Iodamoeba bütschlii	2 (1.1)	0	0	0	0	2 (0.6)	. . .
Trichomonas hominis	1 (0.5)	0	0	1 (1.0)	0	2 (0.6)	. . .
Entamoeba polecki	0	0	0	1 (1.0)	0	1 (0.3)	. . .
Taenia species	1 (0.5)	0	0	0	0	1 (0.3)	. . .
Total Positive Identifications	204	3	6	110	14	337	
Total Number of Children Tested	184	5	14	102	33	338	

NS=no significance

*Numbers in parentheses represent percentage of children in that ethnic group who were examined and found to have the parasite.
†For purposes of evaluating differences among ethnic groups, the Laotian, Lao-Mien and Hmong children were aggregated into a single group. Differences were tested with χ^2, $df=2$.

studied.[5-11] *G lamblia* and hookworm are the most frequently encountered of the intestinal parasites in our Southeast Asian pediatric population, followed closely by *Clonorchis, Strongyloides stercoralis* and *Endolimax nana.* No clear predominance of nematodes, cestodes, trematodes or protozoa appeared in this population.

Our patterns of organism prevalence by ethnic origin differ from those found in other pediatric studies, which also reported findings on a single stool specimen. Goldsmith and associates found *Giardia, Ascaris* and *Entamoeba histolytica* the most common intestinal parasites among Vietnamese infants in San Francisco,[1] although this study looked only at children younger than 1 year. In our Vietnamese group, hookworm and *Trichuris* were most common. Tittle and colleagues found that Laotian children, ages 2 weeks to 17 years (N=36) had hookworm and *Trichuris,*[2] whereas in our sample *Giardia* and *Clonorchis* were most frequent. (In fact, 94% of all *Clonorchis* found was identified among lowland Laotians.) Cambodian children in Tittle's and our study had predominantly hookworm, *Giardia* and *Strongyloides.* The number of children in our sample from the smaller ethnic groups (Lao-Mien, 5; Hmong, 15) was too small to evaluate statistical significance.

Other studies looking at various Indochinese refugee populations of all ages have indicated that people of different ethnic origins will have different intestinal parasites.[12-15] However, most of the reports on Southeast Asian refugees have not separated ethnic groups, but have "lumped" all Southeast Asian refugees together.[5-11]

Of the intestinal parasites found in our pediatric population, *Entamoeba coli, Endolimax nana, Iodamoeba bütschlii* and *Entamoeba hartmanni* are considered nonpathogenic and do not need treatment. Effective therapies are available for the other parasitic infections, however, as has recently been reported in an excellent review.[16]

Summary

The patterns of parasite infection by ethnic group in the Seattle child-refugee population may not be identical with those found elsewhere. Routine screening of asymptomatic patients in pediatric refugee populations for the presence of intestinal parasites appears to be warranted in the Seattle area.

REFERENCES

1. Goldsmith R, Stark F, Smith C, et al: Orphan airlift. JAMA 1976; 235:2114-2116

2. Tittle BS, Harris JA, Chase PA, et al: Health screening of Indochinese refugee children. Am J Dis Child 1982; 136:697-700

3. Melvin DM, Brooke MM: Laboratory Procedures for the Diagnosis of Intestinal Parasites, publication No. (CDC) 75-8282. Atlanta, Dept of Health, Education and Welfare, 1975

4. Fleiss JL: Statistical Methods for Rates and Proportions. New York, John Wiley & Sons, 1973, pp 92-93

5. DeGirolami PC, Kimber J: Intestinal parasites among Southeast Asian refugees in Massachusetts. Am J Clin Pathol 1983; 79:502-504

6. Jones MJ, Thompson JH, Brewer NS: Infectious diseases of Indochinese refugees. Mayo Clin Proc 1980; 55:482-488

7. Erickson RV, Hoang GN: Health problems among Indochinese refugees. Am J Public Health 1980; 70:1003-1006

8. Borchardt KA, Ortega H, Mahood JD, et al: Intestinal parasites in Southeast Asian refugees. West J Med 1981; 135:93-96

9. Sutherland JE, Avant RF, Franz WB, et al: Indochinese refugee health assessment and treatment. J Fam Pract 1983; 16:61-67

10. Glass RI, Cates W, Nieburg P, et al: Rapid assessment of health status and preventive-medicine needs of newly arrived Kampuchean refugees, Sa Kaeo, Thailand. Lancet 1980; 1:868-872

11. Dean AG: Suggestions for medical screening of Southeast Asian refugees. Minn Med 1979; 62:753-754

12. Center for Disease Control: Health status of Indochinese refugees. MMWR 1979; 28:386-390

13. Wiesenthal M, Nickels MK, Hashimoto G, et al: Intestinal parasites in Southeast Asian refugees. JAMA 1980; 244:2543-2544

14. Lindes C: Intestinal parasites in Laotian refugees. J Fam Pract 1979; 9:819-822

15. Goldenring JM, Davis J, McChesney M: Pediatric screening of Southeast Asian immigrants. Clin Pediatr 1982; 21:613-616

16. Most H: Treatment of parasitic infections of travelers and immigrants. N Engl J Med 1984; 310:298-304